

Pulsed Electrogasdynamic Thruster for Attitude Control and Orbit Maneuver, Phase II

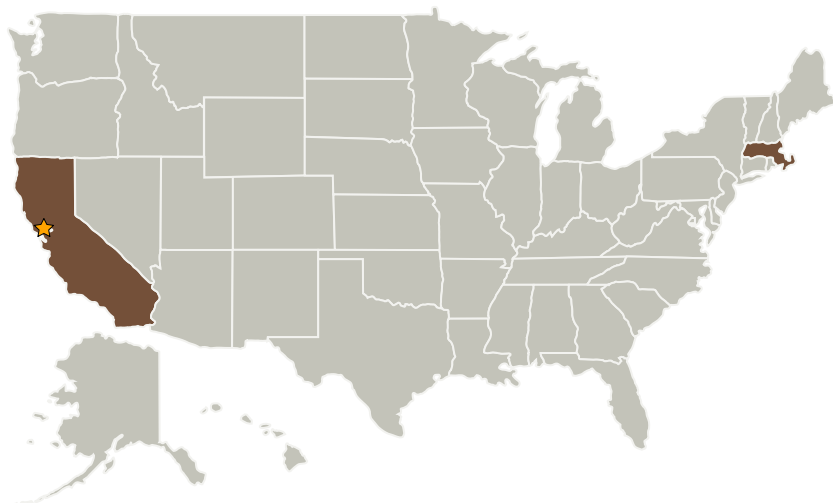
Completed Technology Project (2009 - 2011)



Project Introduction

In the Phase I program we successfully demonstrated the feasibility of the Pulsed ElectroGasdynamic (PEG) thruster for attitude control and orbital maneuvering. In this thruster, propellant gas is introduced into the thrust nozzle through a fast acting gas valve where a short, high voltage pulse is applied to break down and heat the propellant gas. The heated gas expands in the nozzle generating a high impulse ($\sim \text{mN-s}$ per pulse) at a high specific thrust ($120 \text{ } \text{gN-s/joule}$). The specific impulse (I_{sp}) will be in the range of $500 \sim 1500 \text{ sec}$. This process can be repeated at a frequency to meet the spacecraft thrust requirements. The thrust generating mechanism of the proposed thruster is gasdynamic expansion, not magnetohydrodynamic interaction. The proposed thruster is different from the conventional pulsed electrothermal thruster in that the joule heating of the propellant takes place as the propellant gas expands through the divergent nozzle, thereby eliminating the heat and momentum losses at the nozzle throat. Our Phase II objectives are: (i) develop an engineering model; and (ii) develop a proto-flight model of the proposed thruster system.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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| Organizations Performing Work | Role | Type | Location |
|-------------------------------|-------------------------|-------------|---------------------------|
| ★ Ames Research Center(ARC) | Lead Organization | NASA Center | Moffett Field, California |
| Physical Sciences, Inc. | Supporting Organization | Industry | Andover, Massachusetts |

Primary U.S. Work Locations

| | |
|------------|---------------|
| California | Massachusetts |
|------------|---------------|

Project Transitions

**March 2009:** Project Start**June 2011:** Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.2 Electric Space Propulsion
 - └ TX01.2.4 Electrothermal